Architecture 100

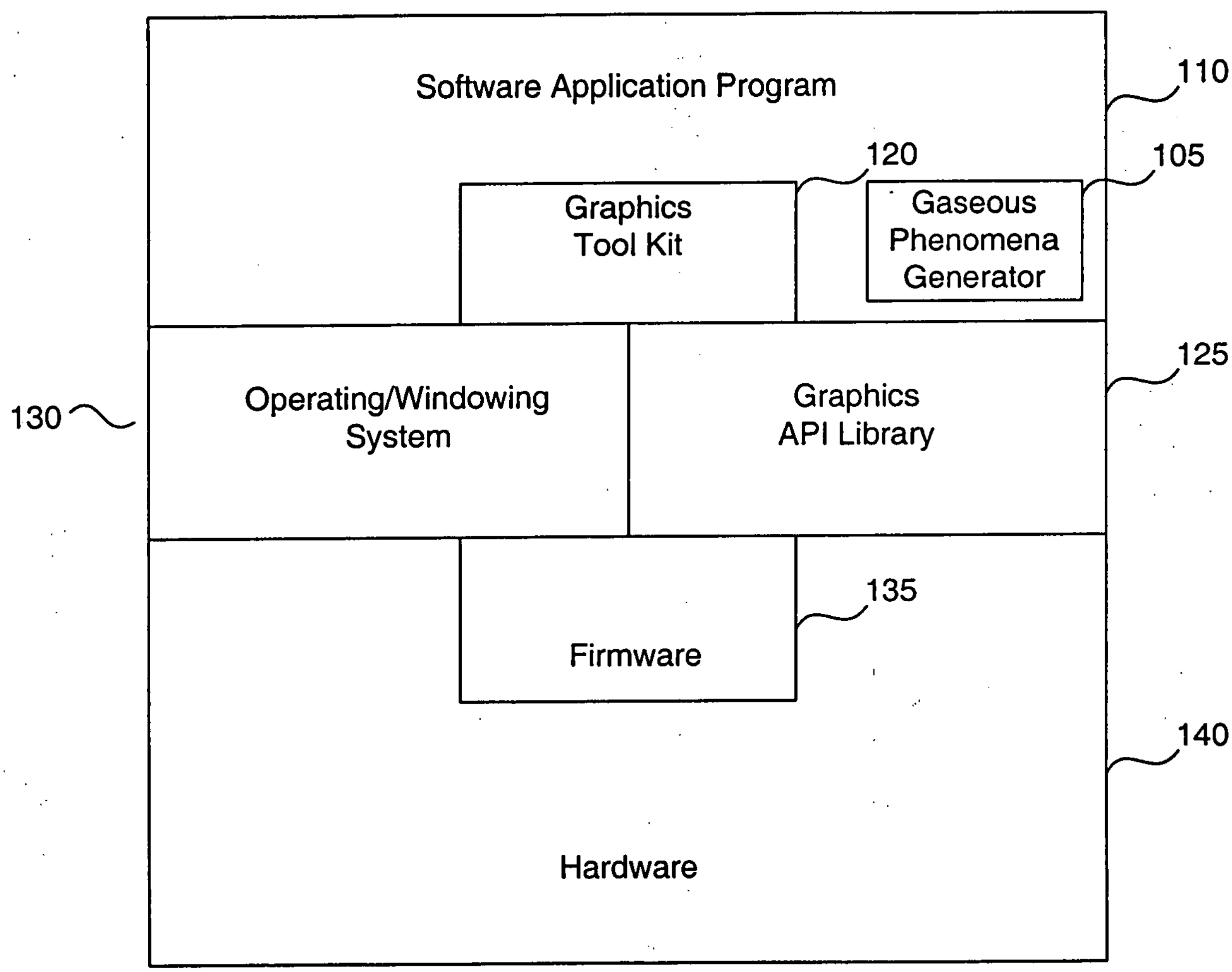

FIG. 1

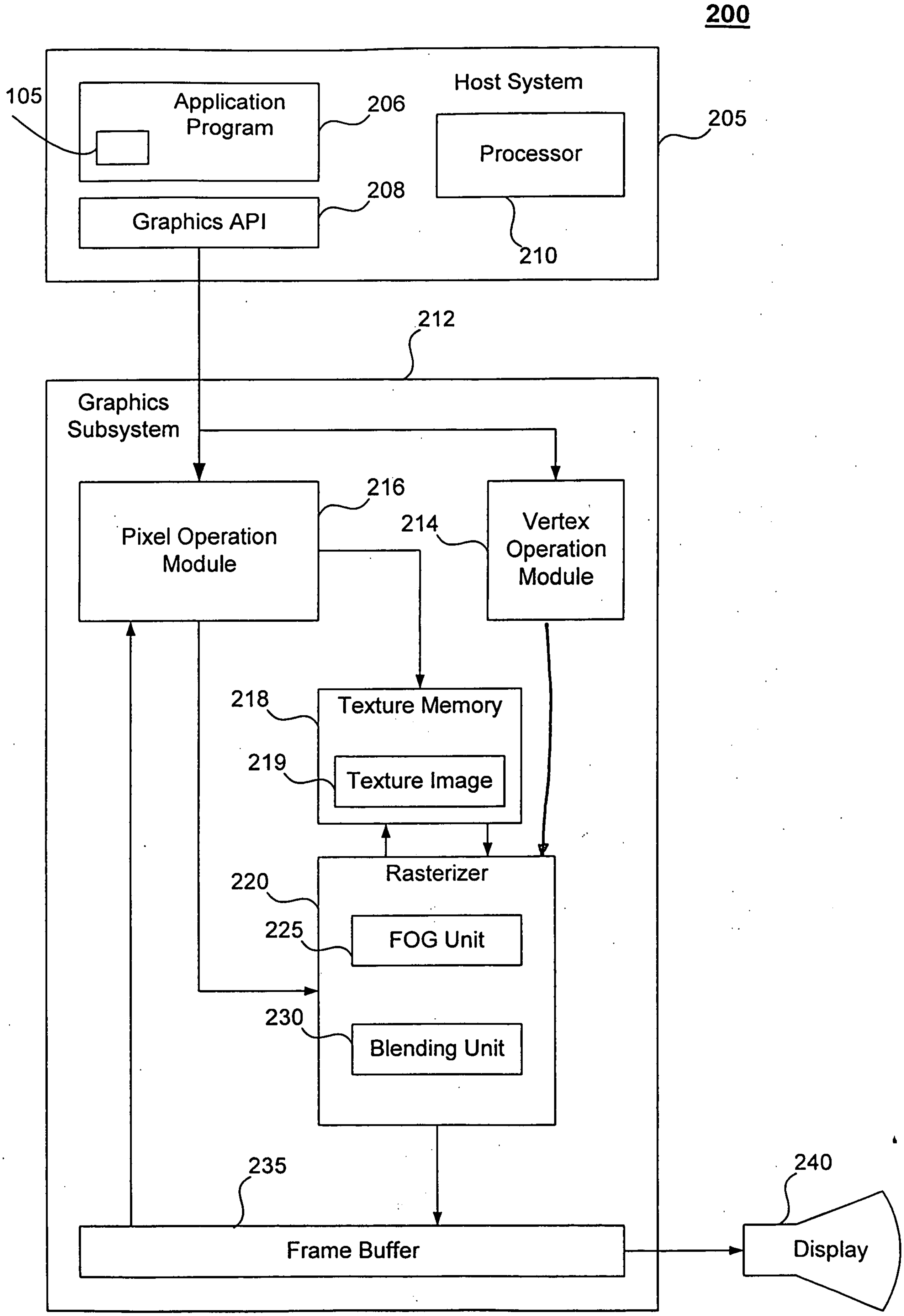

FIG. 2

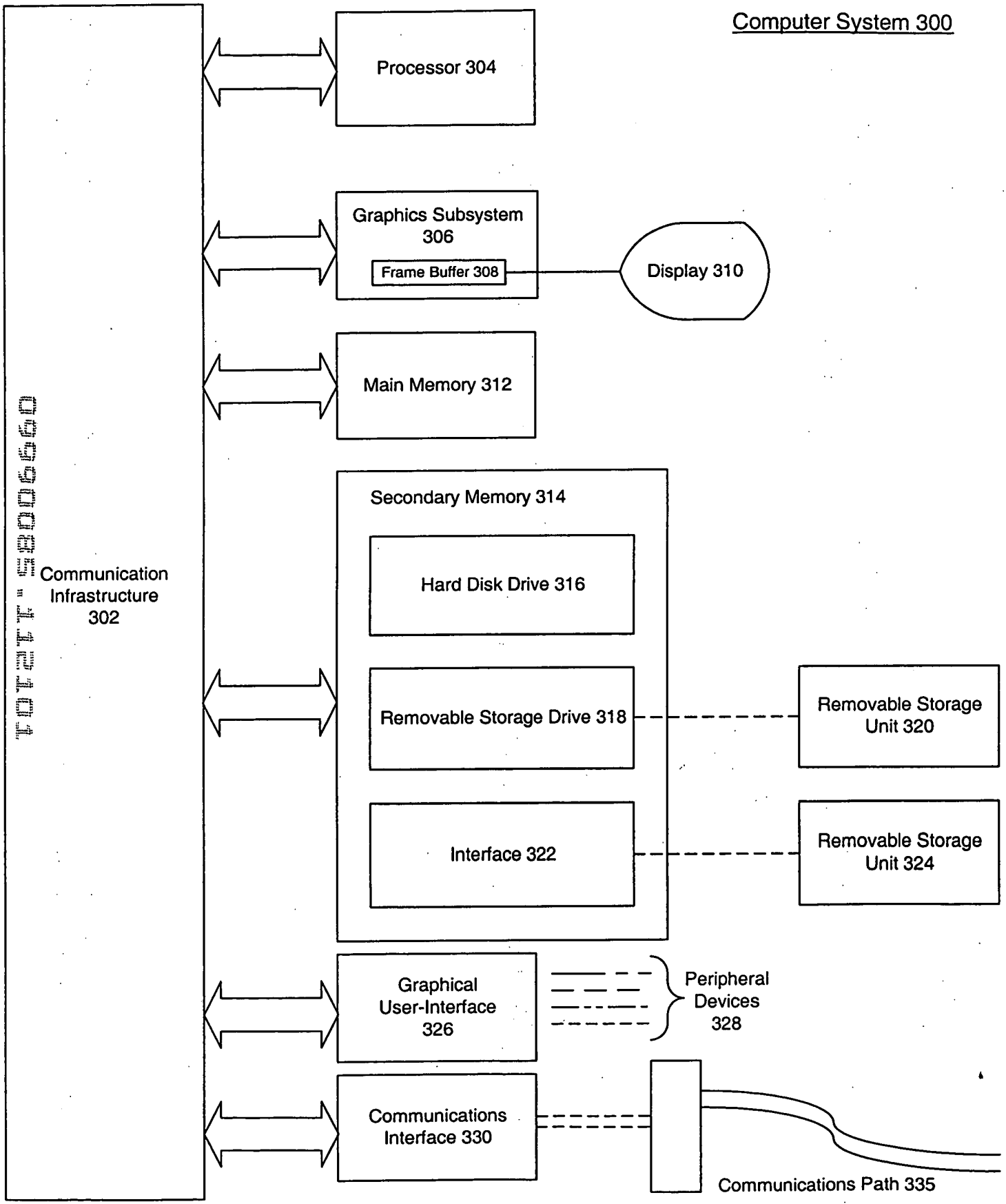
Computer System 300
Processor 304
Graphics Subsystem 306
Frame Buffer 308
Display 310
Main Memory 312
Secondary Memory 314
Hard Disk Drive 316
Removable Storage Drive 318
Removable Storage Unit 320
Interface 322
Removable Storage Unit 324
Communication Infrastructure 302
Graphical User-Interface 326
Peripheral Devices 328
Communications Interface 330
Communications Path 335

FIG. 3

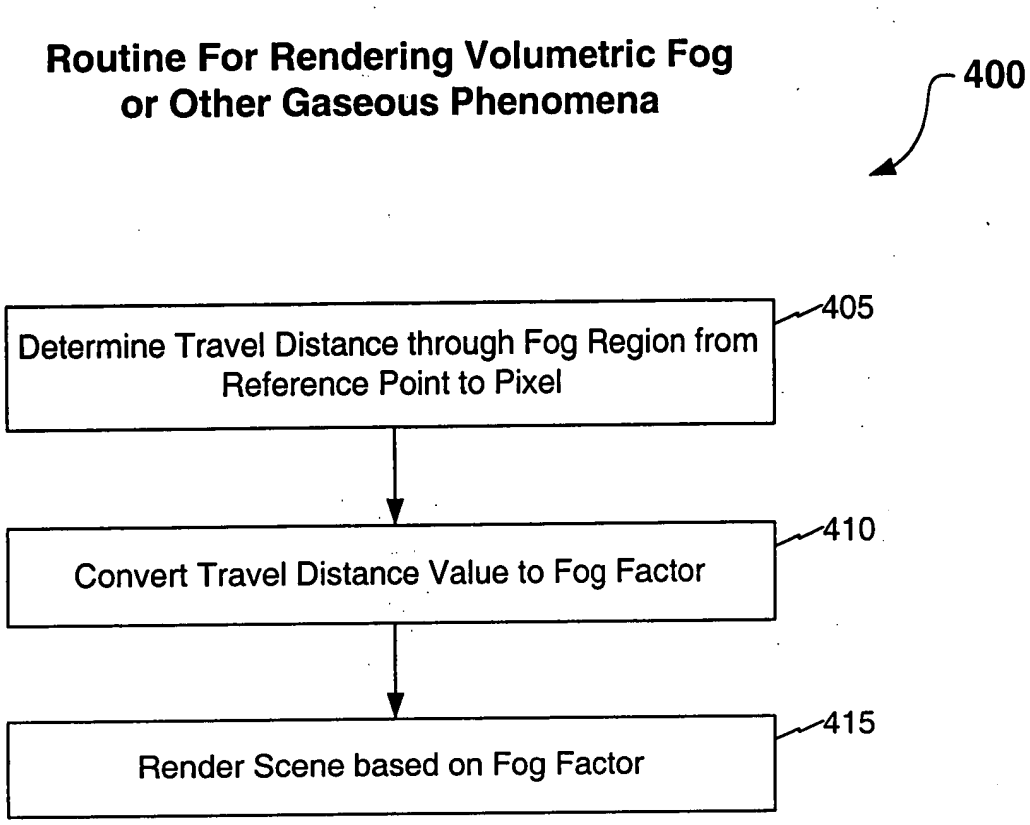

FIG. 4

Determine Travel Distance through Fog Region from Reference Point to Pixel

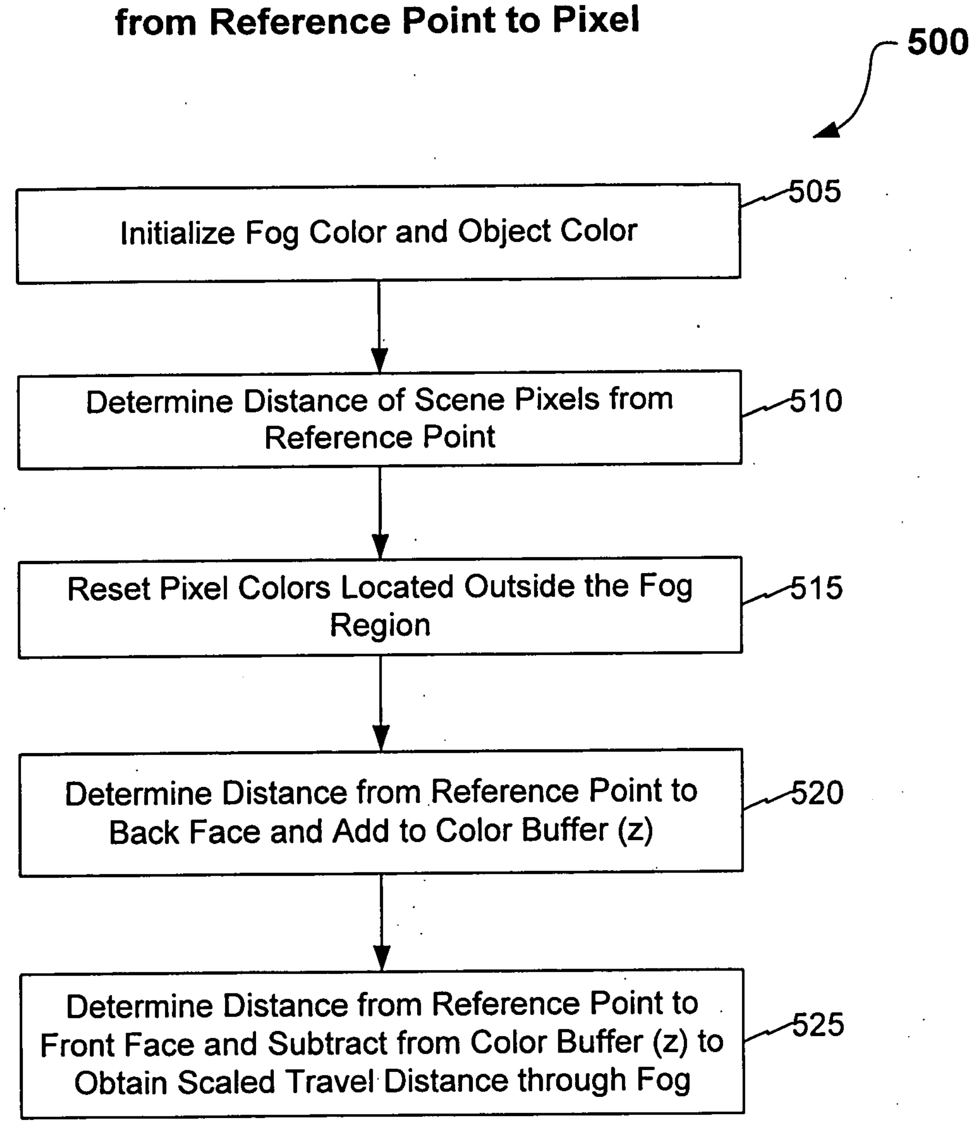

FIG. 5

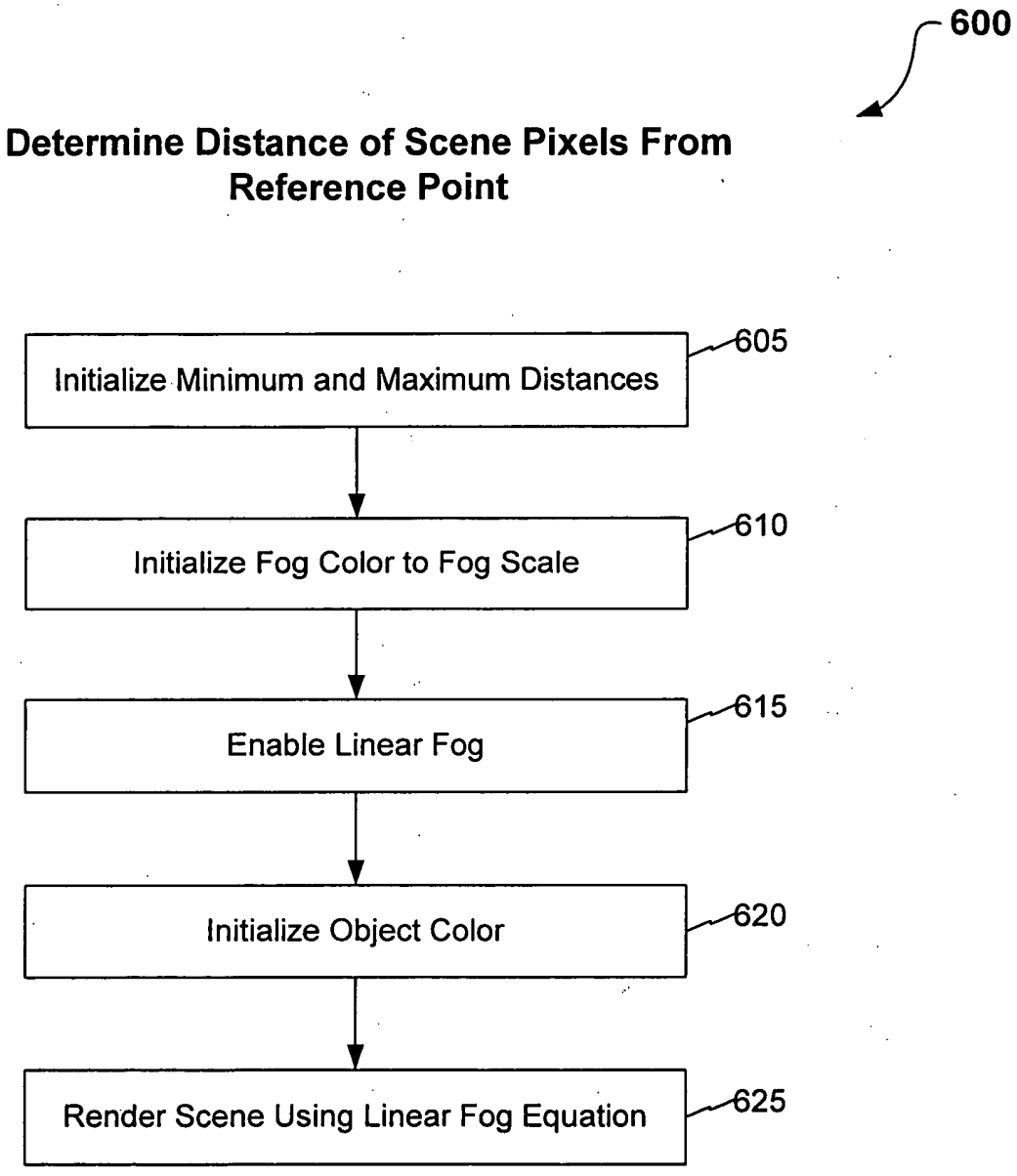

FIG. 6

Linear Fog Equation

Equation One (1)

$$\text{Attenuation Factor}(f) = \frac{\text{Maximum Distance} - \text{Pixel Distance}}{\text{Maximum Distance} - \text{Minimum Distance}}$$

Equation Two (2)

$$\text{Color} = f \bullet \text{Object Color} + (1-f) \bullet \text{Fog Color}$$

Equation Three (3)

$$\text{Color} = \frac{\text{Pixel Distance} - \text{Minimum Distance}}{\text{Maximum Distance} - \text{Minimum Distance}} \bullet \text{Fog Scale}$$

FIG. 7

Reset Pixel Colors Located Outside the Fog Region

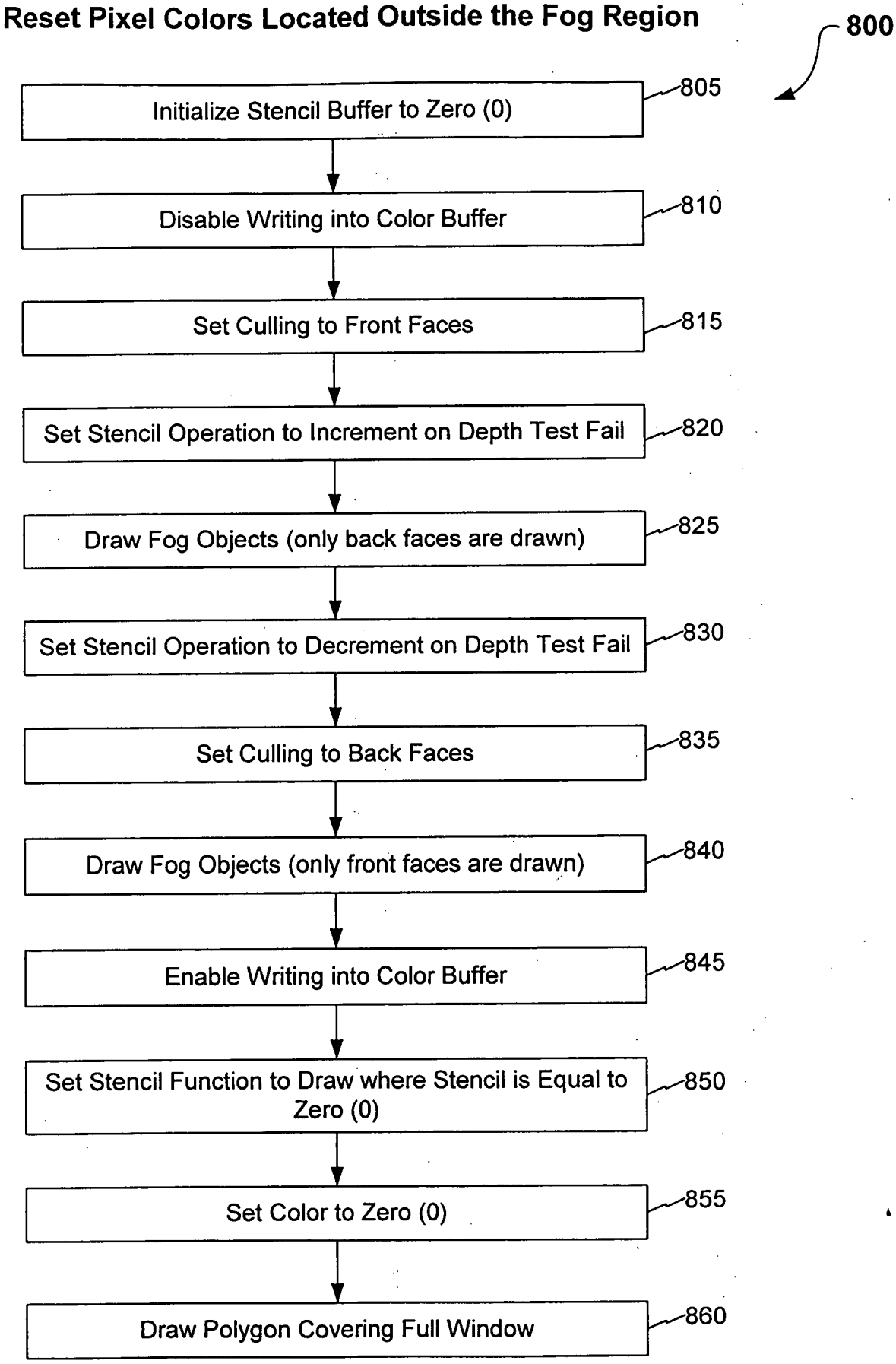

FIG. 8

Determine Travel Distance through Fog Region from Reference Point to Pixel

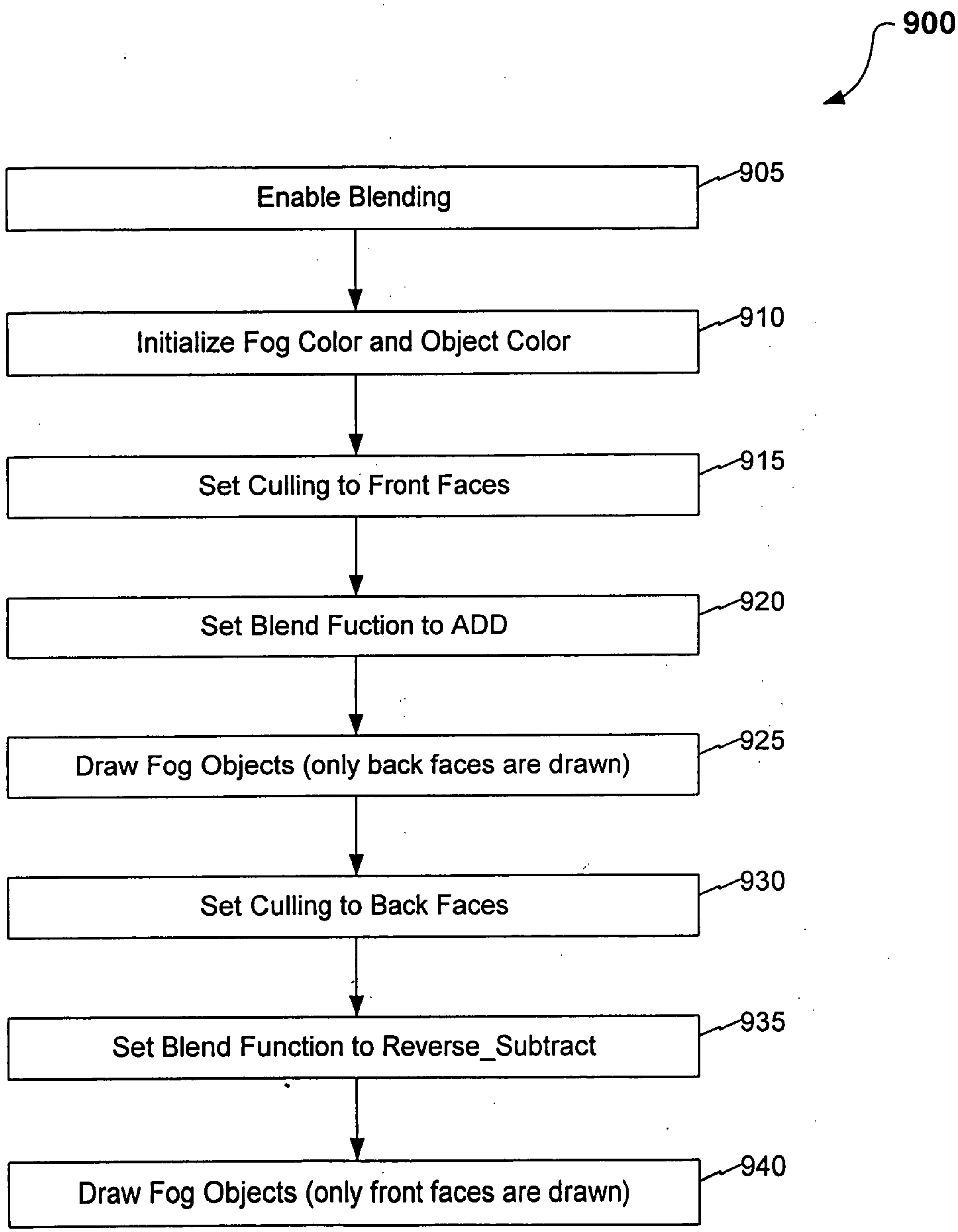

FIG. 9

Render Scene Based on Fog Factor

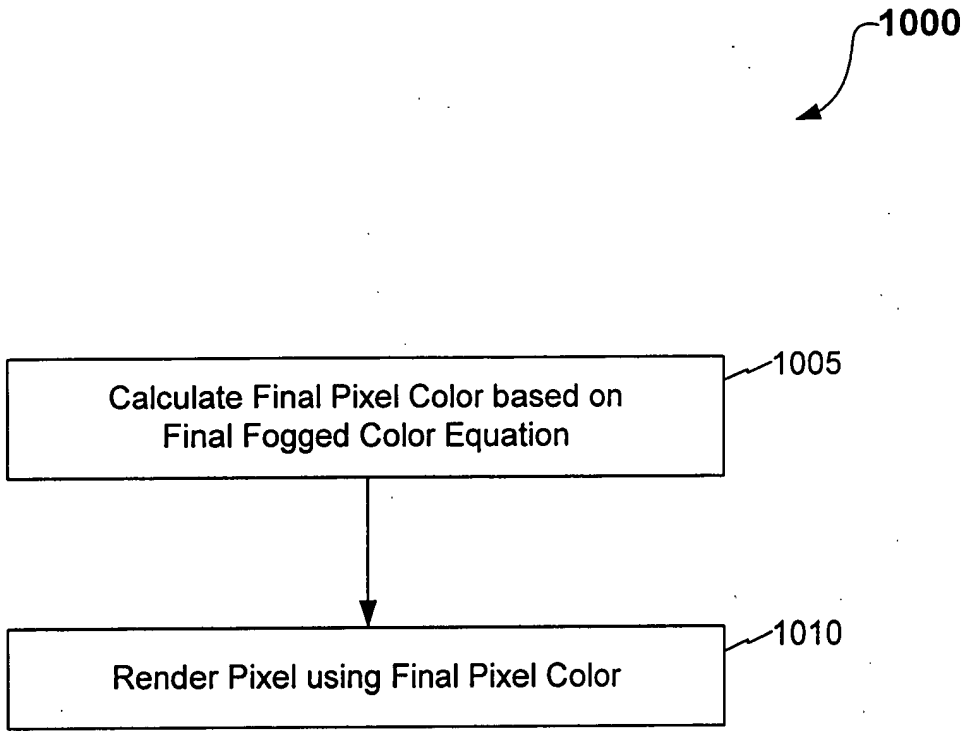

FIG. 10

Final Fogged Color Equation

Unfogged pixel color • fog factor + fog color • (1 - fog factor)

FIG. 11

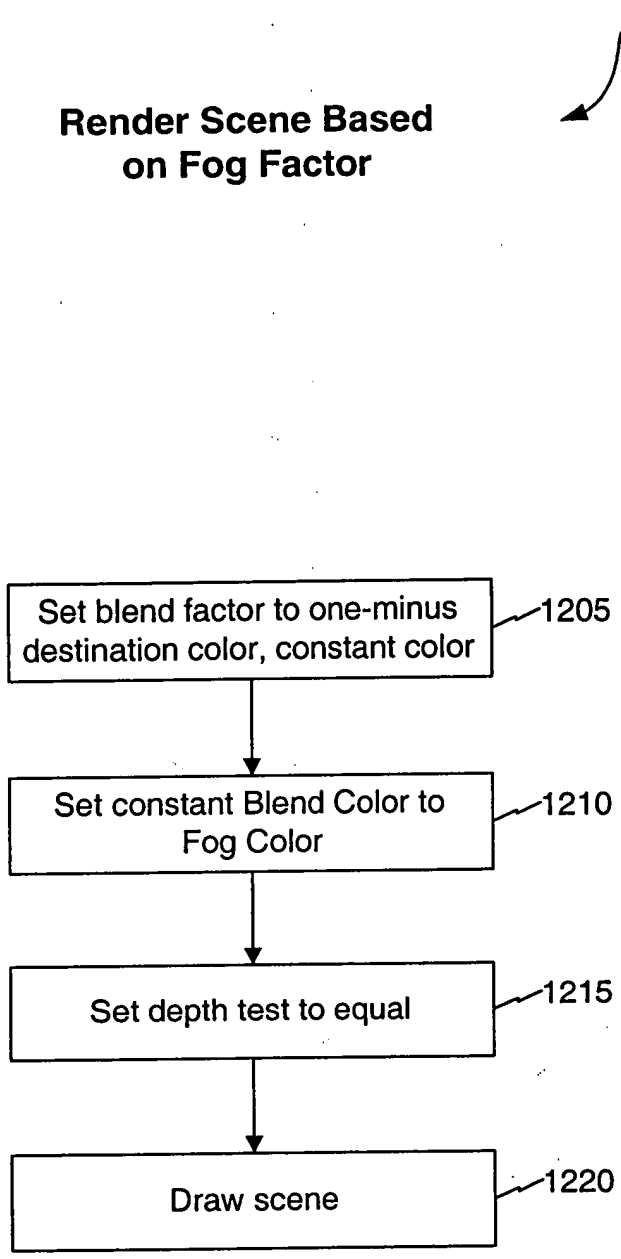

FIG. 12

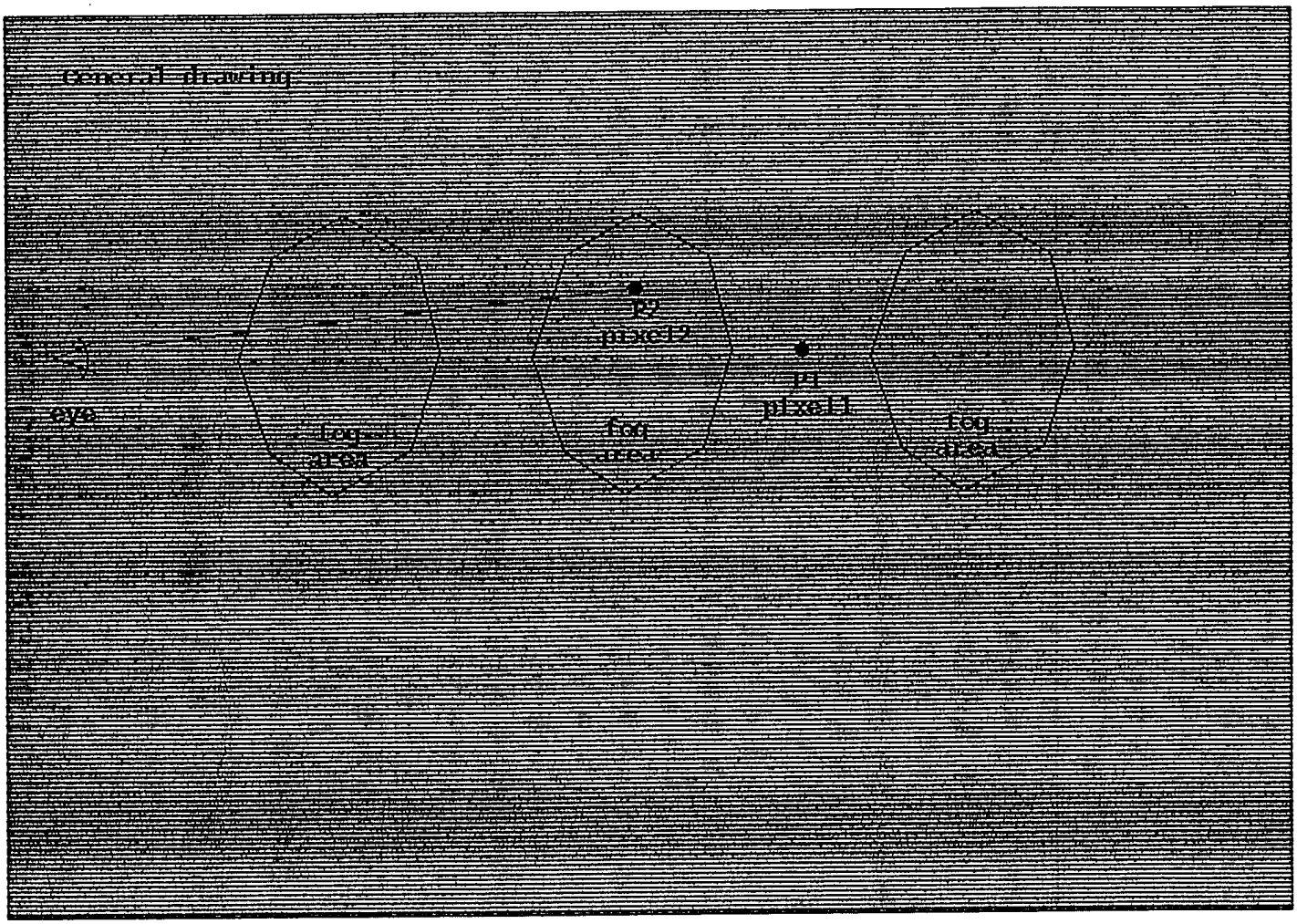
General drawing
eye
fog area
fog area
fog area
p2
pixel2
p1
pixel1

FIG. 13A

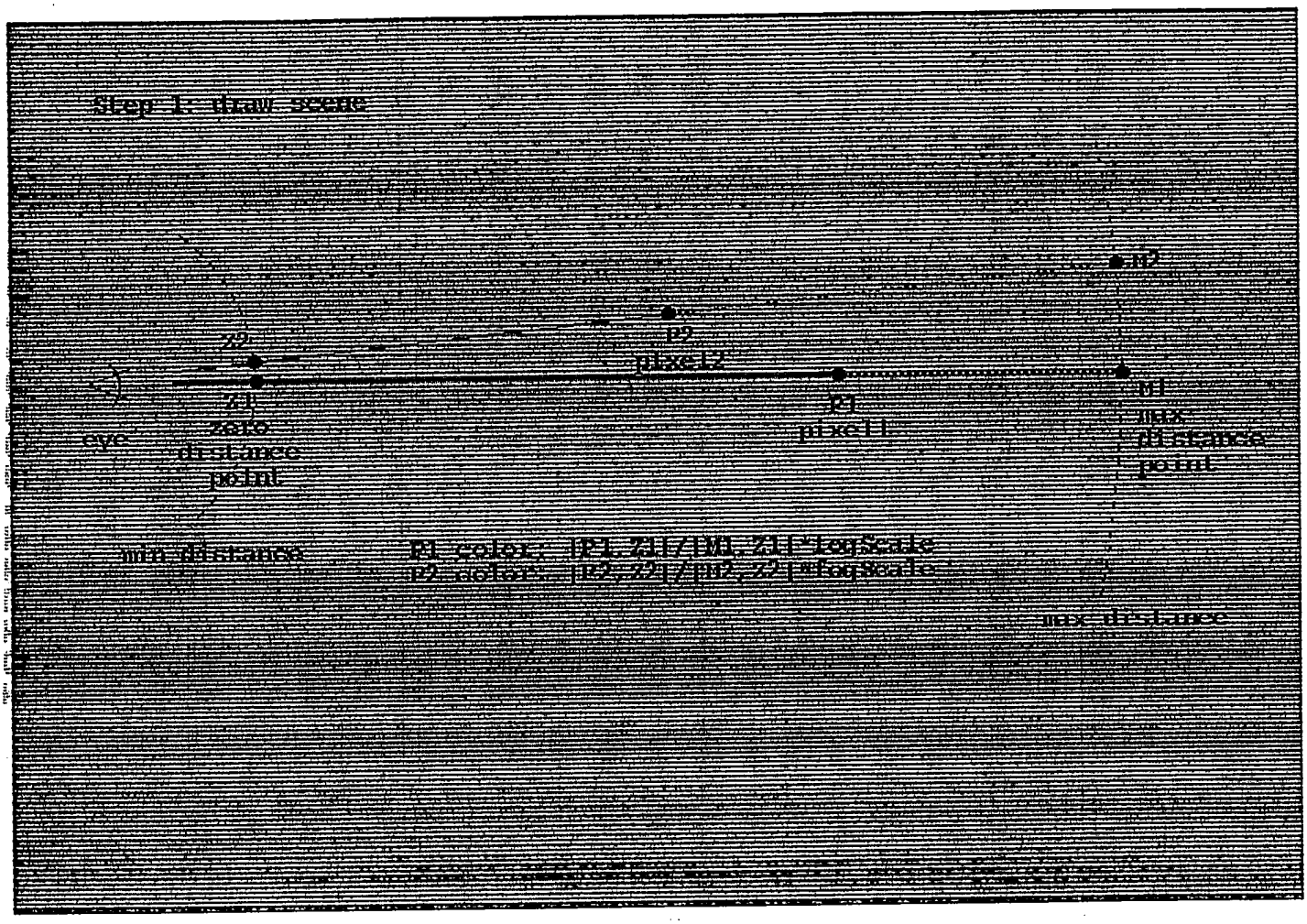
Step 1: draw scene
M2
p2
pixel2
z2
z1
zero
distance
point
eye
p1
pixel1
M1
max
distance
point
min distance
p1 color: [P1 z1/M1 z1]*fogScale
p2 color: [p2 z2/M2 z2]*fogScale
max distance

FIG. 13B

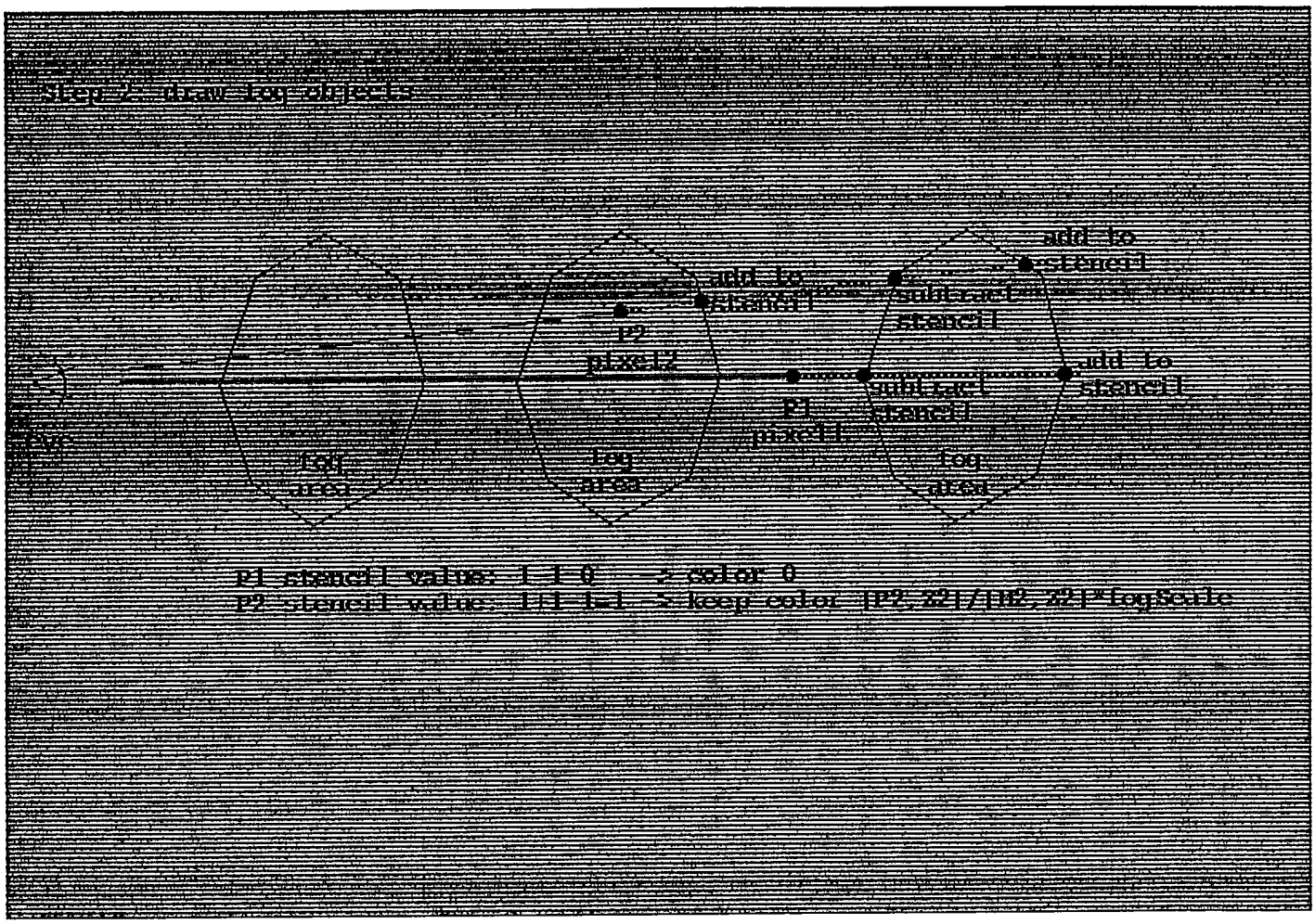
Step 2: draw fog objects
add to stencil
subtract stencil
add to stencil
P2 pixel
subtract stencil
add to stencil
P1 pixel
fog area
fog area
fog area
P1 stencil value: 1 1 0 -> color 0
P2 stencil value: 1 1 1 -1 -> keep color (P2: 221/112, 221*logScale

FIG. 13C

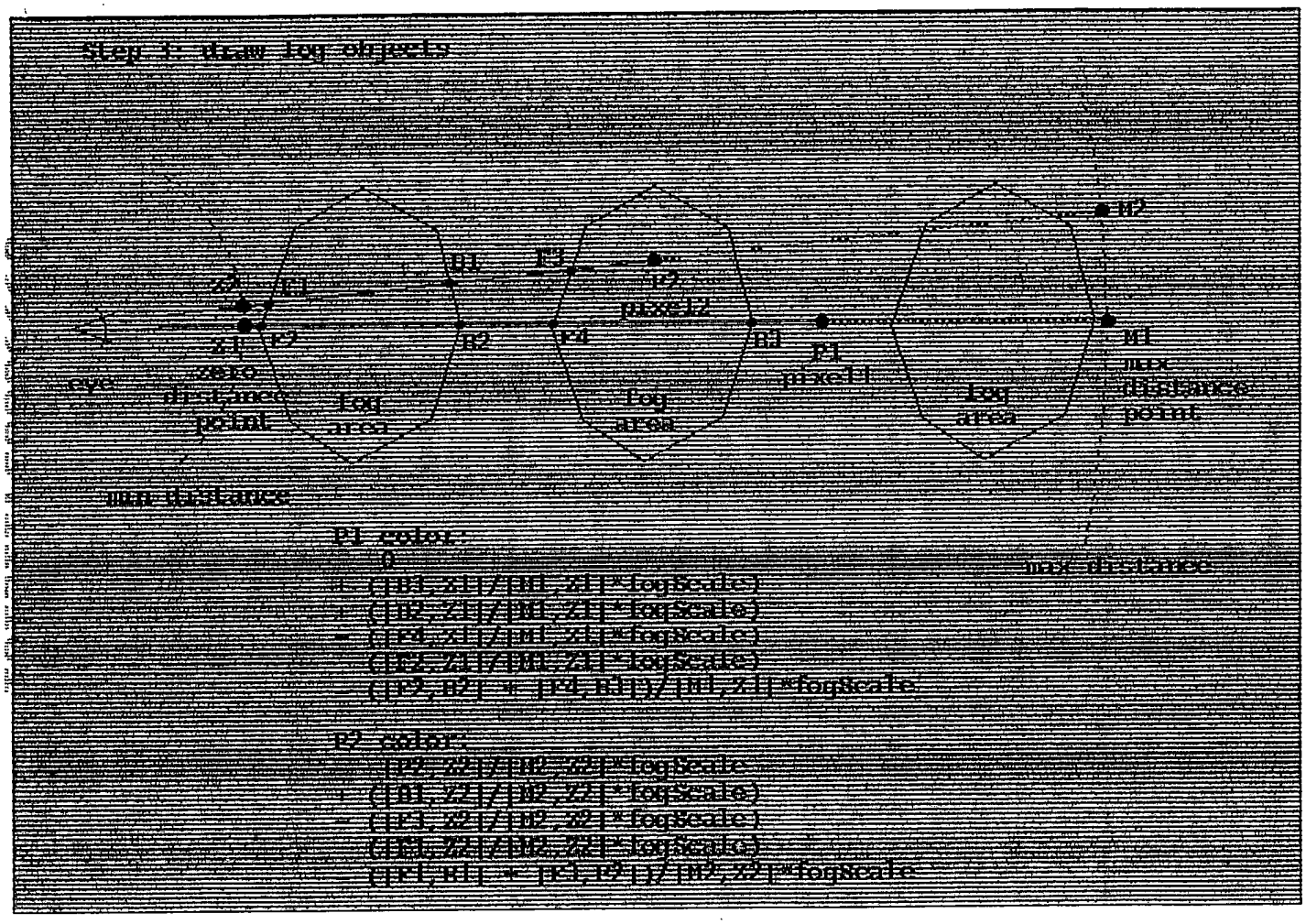
Step 3: draw fog objects
z2
r1
z1
r2
eye
zero distance point
n1
r3
n2
r4
fog area
pixel2
n3
p1 pixel1
fog area
n2
m1
max distance point
min distance
p1 color:
0
+ (|n1, z1|/|n1, z1|*fogScale)
+ (|n2, z1|/|n1, z1|*fogScale)
- (|r4, z1|/|m1, z1|*fogScale)
(|r2, z1|/|m1, z1|*fogScale)
(|r2, n2| - |r4, n3|)/|m1, z1|*fogScale
p2 color:
|p2, z2|/|n2, z2|*fogScale
+ (|n1, z2|/|n2, z2|*fogScale)
- (|r3, z2|/|n2, z2|*fogScale)
(|n1, z2|/|n2, z2|*fogScale)
(|r1, n1| - |r3, n2|)/|n2, z2|*fogScale
max distance

FIG. 13D

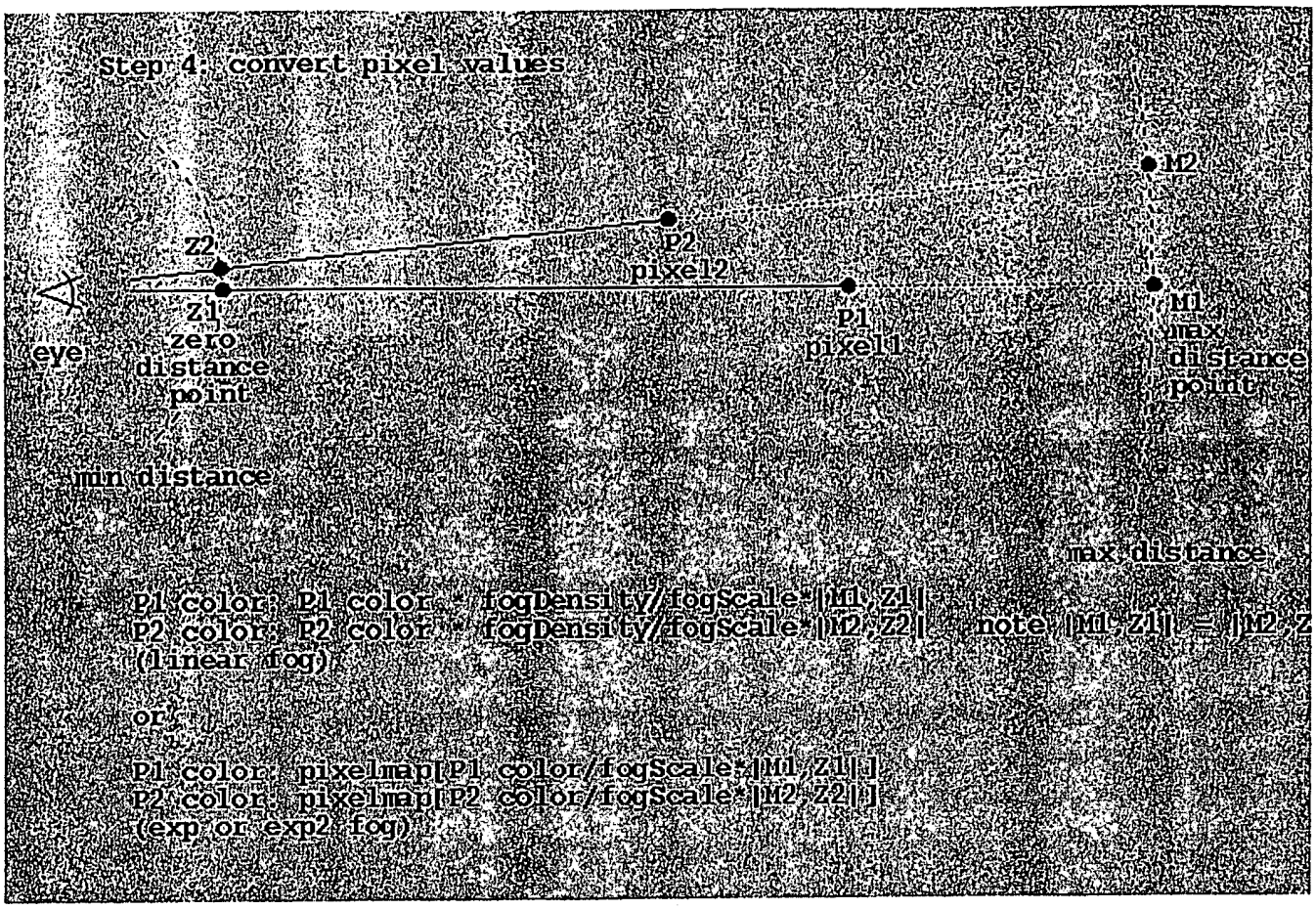

FIG. 13E

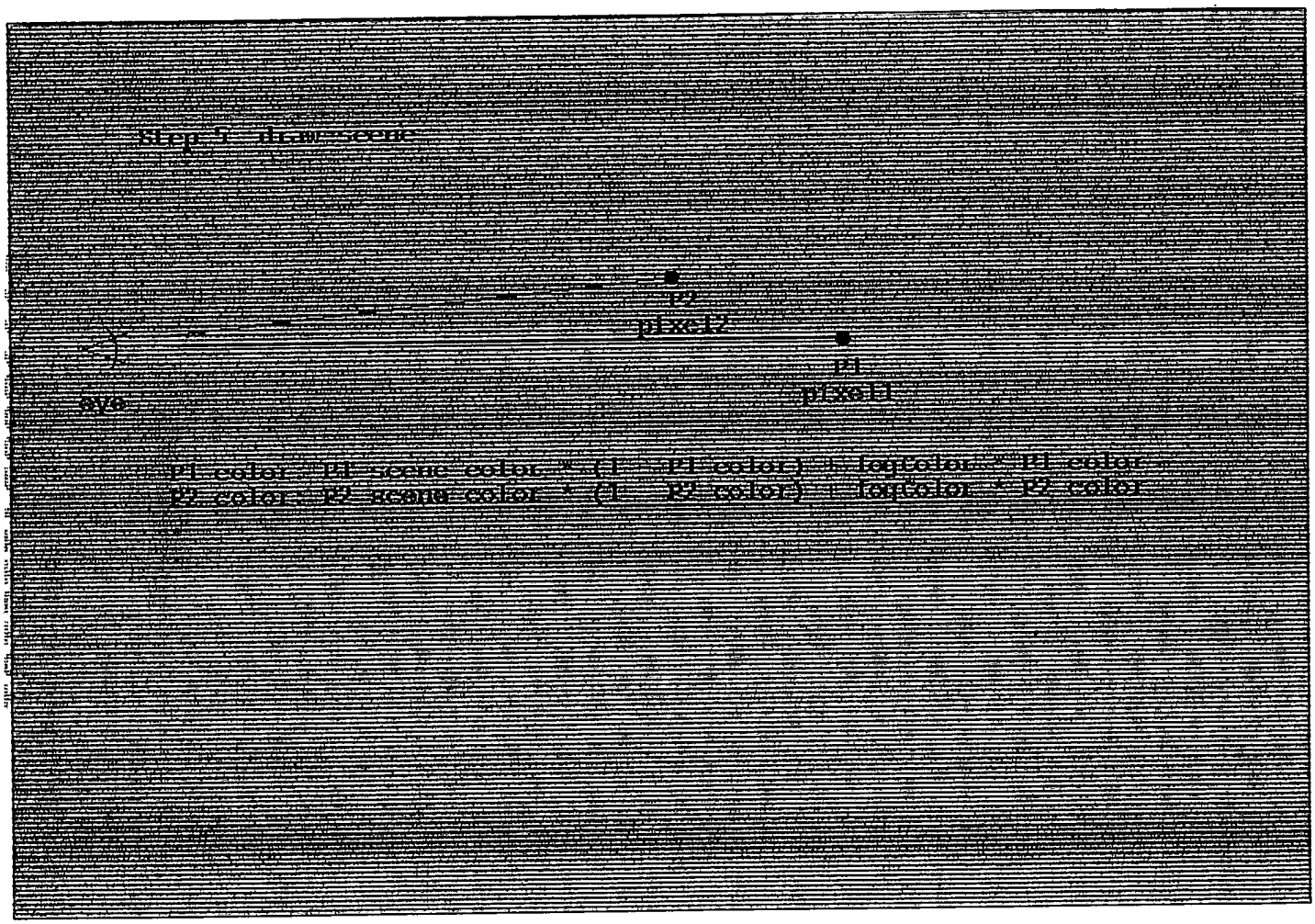
Step 5 - Blend scene
p2
p1xel2
p1
p1xel1
eye
p1 color = P1 scene color * (1 - P1 color) + topColor * P1 color
p2 color = P2 scene color * (1 - P2 color) + topColor * P2 color

FIG. 13F